

Chrysler Corporation  
New Process Gear Division  
Chrysler Drive  
Syracuse, New York

**MANUFACTURING PROCESSES**

The New Process Gear Division of Chrysler Corporation manufactures standard automotive transmissions for truck and passenger cars. At the present time, the New Process Gear Division has two plants in Syracuse; the Wolf Street Plant and the Chrysler Drive Plant. The former manufactures finished transmission casings from purchased rough castings, while the latter manufactures gears from rough castings obtained elsewhere. The Chrysler Drive Plant also produces the assembled gear boxes and transmissions, using the Wolf Street casings and the Chrysler Drive Plant gears. The basic processes at the Chrysler Drive Plant include annealing, soft turning and cutting, parts washing, heat treating, and hard grinding of various sizes and shapes of metal.

Currently, both plants are in production 6-days per week, 24-hours per day. At the Chrysler Drive Plant, 994 persons are employed on the first shift, 350 on the second shift, and 170 on the third shift. The smaller Wolf Street Plant has 178 employees on the first shift, 95 on the second, and 28 on the third. Plans have been approved to phase out the Wolf Street Plant and to move all production to the larger facility, where the combined wastewater will be treated in an expanded, modernized treatment plant. After treatment, that wastewater will be discharged to the Ley Creek Sewage Treatment Plant.

**WASTEWATER PRODUCTION AND TREATMENT**

Total wastewater usage at the Chrysler Drive Plant varies between 200,000 and 275,000 gallons per day. Approximately 80,000 gallons per day of water are used in the once-through cooling water system, discharged in part to the sanitary sewer with the remainder to the storm sewer (surface disposal). The process wastewater, approximately 110,000 gallons per day, and sanitary wastewater, estimated at 15,000 - 30,000 gallons per day, are discharged to the combined sanitary-process sewer.

Process wastewater is contaminated with alkaline cleaners and soluble mineral and lubricating oils. The contaminated process wastewaters are treated in an on-site treatment system with alum flocculation and air flotation before discharge to the Ley Creek Sewage Treatment Plant System. The recovered oil is reprocessed. A flow diagram of the present treatment facilities has been placed in the file but is not appended to this report. When the Wolf Street facilities are combined with the present facilities at Chrysler Drive, the amount of process wastewater will be increased, although the general wastewater characteristics are not expected to change significantly. By that time, personnel at the New Process Gear Division anticipate completion of a new treatment facility, which will effectively treat the total process wastewater flow. Since discussions regarding this proposed wastewater treatment facility are still in progress between New Process Gear Division personnel and personnel from the Onondaga County Department of Public Works, these new facilities will not be discussed in this report. However, these proposed facilities are being designed to produce a wastewater quality that will comply with the Onondaga County sewer regulations of 28 February 1968 entitled "Rules and Regulations Governing the Use of Public Sewers."

#### *SAMPLING AND ANALYSIS SURVEY*

The sanitary-process wastewater discharge at the Chrysler Drive location was sampled at Manhole 2-S, as shown on Chrysler's Drawing S-2, "Site Plan and Miscellaneous Details" (dated 30 January 1964). A copy of this drawing has been included in the job file but has not been appended. A number of grab and composite samples were collected over various periods of time; concurrently, flow determinations were made by the lithium dilution technique. A standard solution of lithium chloride was introduced at a known rate into the sink discharge located just outside the doorway of the treatment plant room. After measuring the lithium concentration in the effluent samples, the flow rate over the sampling period was calculated. Average influent flow rates were calculated from the influent water meter readings taken at various time intervals by Chrysler personnel. Drawing No. 1 illustrates the average flow rates for the total influent water and the effluent sanitary/process wastewater. Samples collected from the sanitary-process sewer were analyzed for COD, suspended solids, volatile suspended solids, total solids, pH, alkalinity/acidity, oil and grease (total carbon tetrachloride extractable material), orthophosphate, and total phosphate.

The main storm sewer at the Chrysler Drive location was sampled at Manhole No. 4 as shown on Chrysler Drawing No. S-2. A number of grab samples were taken during the wastewater sampling survey. All samples were analyzed for COD, suspended solids, pH, alkalinity or acidity, and oil and grease (total carbon tetrachloride extractable material). Flow determinations were not attempted.

The storm sewer system from the Chrysler Drive Plant discharges to surface drainage which flows across Chrysler Drive, near the location of the Town of DeWitt Water Company and the Carrier Corporation water tower. This drainage was observed to contain a large amount of floating oil, which appeared to be an accumulation retained by weeds and other types of undergrowth present. However, the water flowing into this area appeared to contain oil contamination similar in concentration to that observed in Chrysler's storm sewer. The three grab samples collected were analyzed for COD, suspended solids, pH, alkalinity or acidity, and oil and grease (total carbon tetrachloride extractable materials). No flow determinations were made.

#### *DISCUSSION*

Raw data from the analyses of samples collected from the sanitary-process sewer are shown in Table NPG-1, and the data expanded to pounds per day are shown in Table NPG-2. Based upon this data, a comparison between Chrysler's wastewater discharge and the total loading to the Ley Creek Sewage Treatment Plant was made. Grab and composite samples from Chrysler were weighted equally. The comparison of mean values, shown in Table 1, indicates that Chrysler contributes approximately 1.8 percent of the oil and grease (carbon tetrachloride extractables) entering the Ley Creek Sewage Treatment Plant. Although this is not a significant portion of the Ley Creek Sewage Treatment Plant loading, the median oil concentration (205 mg/L) discharged during the survey from Chrysler exceeded the limit established in Section 3(b) of Onondaga County's "Rules and Regulations Governing the Use of Public Sewers."

Analyses of the storm sewer samples, shown in Table NPG-3, revealed high organic (COD) and solids concentrations on at least two occasions. These appear to be higher than normal for storm sewer discharges. Furthermore, oil and grease was observed in every sample taken, with the oil concentration varying from 1.8 to 9.2 mg/L, which is also higher than would be expected in a stormwater.

Raw data on the three grab samples collected from the surface drainage along Chrysler Drive are shown in Table NPG-4. High COD and oil concentrations (up to 3,840 mg/L COD and 686 mg/L Oil) were observed in the first and third samples, collected in a quiescent area of the stream where oil might be expected to accumulate. The second sample was taken from a more turbulent area and should be more representative of wastewater quality.

#### *CONCLUSIONS*

Based upon our initial plant visit and the result of our wastewater sampling survey, the following conclusions may be drawn:

Table 1

Wastewater Characteristics  
Pounds Per Operating Day

Parameter <sup>1</sup>	Ley Creek STP Influent			Chrysler Corporation		
	Mean	Median	Range	Mean <sup>2</sup>	Median <sup>2</sup>	Instantaneous Rate
Flow (MGD)	13.7	14.0	8.7-18.8	.113	.108	0.069-0.167
BOD <sub>5</sub>	51,073	47,791	15,354-202,419	-	-	-
BOD <sub>uc</sub>	71,117	69,572	19,912-251,149	-	-	-
COD	115,965	101,879	26,309-341,738	698	624	178-1438
pH	-	7.0	6.0-8.8	-	6.6	4.0-7.7
Acidity	838	0	0-6,647	-	-	-
Alkalinity	1,320	0	0-23,091	-	-	-
SS	74,776	54,205	1,599-325,906	258	217	63-715
VSS	36,362	29,468	- -106,011	215	190	52-549
TS	-	-	-	633	531	345-1196
Oil and Grease	10,326	8,634	2,602-22,496	187.8	163	13.8-584.2
Cyanide	8.71	1.99	0.09-95.98	-	-	-
Phenol	29.40	19.49	0.80-113.95	-	-	-
Chromium	39.91	30.37	10.19-198.87	-	-	-
Copper	34.65	32.48	9.09-76.22	-	-	-
Zinc	84.79	93.75	18.11-183.22	-	-	-
Cadmium	8.45	5.93	1.5-40.54	-	-	-
Nickel	16.22	15.59	2.05-38.19	-	-	-
NH <sub>3</sub>	1,373.3	1,775.2	864.1-3,540.5	-	-	-
Org-N	3,278.2	3,111.4	979.6-6,822.2	-	-	-
Ortho-PO <sub>4</sub>	3,244	2,957	727-15,294	30.2	12.4	8.1-204.4
Total-PO <sub>4</sub>	6,397	6,762	1,200-19,542	46.6	25.8	13.6-204.4

<sup>1</sup>Pounds per day except as noted.

<sup>2</sup>Mean and Median values have been adjusted and are given in pounds per operating day.

1. The carbon tetrachloride extractable material (oil and grease) in the sanitary-process sewer exceeds allowable discharge limits.
2. Wastewater in the storm sewer contains carbon tetrachloride extractable material. Organics and suspended solids materials are also present on occasion.

#### **RECOMMENDATIONS**

1. Remove the sources of oil, organics, and solids presently discharging into the storm sewer system.
2. Treat all wastewater containing carbon tetrachloride extractable material as required to comply with the established sewer discharge requirements set forth by the Onondaga County Department of Public Works on 28 February 1968.

CHRYSLER CORPORATION  
NEW PROCESS GEAR DIVISION  
SYRACUSE, NEW YORK

TABLE NPG-1

THIS TABULATION IS THE RAW DATA FROM THE SURVEY  
FLOW IS IN MILLION GALLONS PER DAY  
CONCENTRATIONS ARE IN MILLIGRAMS PER LITER

SANITARY PROCESS SEWER DIS.

ID	DATE	TIME	SAMPLING TIME HOURS	FLOW	COD	PH	ALKAL	ACID	SS	TS	VSS	OIL	O-PO4	T-PO4	
426	08	12 68	1205	grab	0.108	388	7.4	12	0	204	590	156	40.2	13.6	63.5
427	08	12 68	1520	3.1	0.069	310	6.8	0	6	110	599	90	24.1	16.0	45.0
431	08	12 68	1920	4.0	0.108	765	7.4	12	0	328	0*	270	223.0	12.7	39.7
435	08	13 68	1100	1.5	0.102	750	6.8	0	6	266	622	236	222.3	240.0	240.0
440	08	14 68	0400	12.0	0.072	1920	6.6	0	12	538	903	498	273.0	21.0	38.5
444	08	14 68	1528	5.1	0.128	1272	6.6	0	12	410	767	360	316.0	20.6	38.0
446	08	14 68	2300	7.4	0.103	705	6.6	0	12	132	544	132	188.0	12.0	28.6
447	08	15 68	0923	grab	0.108	210	6.6	0	12	88	482	58	31.6	11.4	15.2
449	08	15 68	0910	10.2	0.167	324	5.8	0	50	86	601	70	93.0	9.6	18.6
451	08	15 68	1515	2.9	0.108	952	7.7	40	0	432	1329	344	440.0	21.5	41.5
456	08	16 68	0854	grab	0.108	550	6.1	0	12	230	0*	198	134.0	9.0	16.0
464	08	19 68	1500	5.9	0.155	1110	4.0	0	99	552	0*	424	451.0	52.2	82.5
468	08	20 68	0800	16.7	0.087	1090	5.8	0	24	344	0*	312	238.0	17.8	31.4
476	08	21 68	0800	16.0	0.155	440	0.0*	0*	0*	156	0*	122	72.6	7.1	15.5

TABLE NPG-2

THIS TABULATION IS THE DATA EXTENDED TO POUNDS PER DAY  
FLOW IS IN MILLION GALLONS PER DAY

SANITARY PROCESS SEWER DIS.

ID	DATE	TIME	FLOW	COD	PH	ALKAL	ACID	SS	TS	VSS	OIL	O-PO4	T-PO4	
426	08	12 68	1205	0.108	349	7.4	11	0	184	531	140	36.1	12.2	57.1
427	08	12 68	1520	0.069	178	6.8	0	3	63	345	52	13.8	9.2	25.9
431	08	12 68	1920	0.108	688	7.4	11	0	295	0*	243	200.6	11.4	35.7
435	08	13 68	1100	0.102	639	6.8	0	5	227	530	201	189.3	204.4	204.4
440	08	14 68	0400	0.072	1152	6.6	0	7	323	542	299	163.7	12.6	23.1
444	08	14 68	1528	0.128	1358	6.6	0	13	438	819	384	337.3	22.0	40.5
446	08	14 68	2300	0.103	609	6.6	0	10	114	470	114	162.3	10.3	24.7
447	08	15 68	0923	0.108	189	6.6	0	11	79	434	52	28.4	10.2	13.6
449	08	15 68	0910	0.167	451	5.8	0	70	120	836	97	129.4	13.3	25.8
451	08	15 68	1515	0.108	856	7.7	36	0	389	1196	309	395.8	19.3	37.3
456	08	16 68	0854	0.108	495	6.1	0	11	207	0*	178	120.5	8.1	14.4
464	08	19 68	1500	0.155	1438	4.0	0	128	715	0*	549	584.2	67.6	106.8
468	08	20 68	0800	0.087	798	5.8	0	18	252	0*	228	174.1	13.0	22.9
476	08	21 68	0800	0.155	570	0.0*	0*	0*	202	0*	158	94.0	9.2	20.0

\*=NO ANALYSIS

CHRYSLER CORPORATION  
NEW PROCESS GEAR DIVISION  
SYRACUSE, NEW YORK

TABLE NPG-3

THIS TABULATION IS THE RAW DATA FROM THE SURVEY  
CONCENTRATIONS ARE IN MILLIGRAMS PER LITER

STORM SEWER DISCHARGE									
ID	DATE	TIME	COD	PH	ALKAL	ACID	SS	OIL	
437	08 13 68	1522	10	7.0	0	0	18	4.1	
439	08 14 68	1024	10	7.2	4	0	8	9.2	
448	08 15 68	1010	38	6.6	0	8	8	5.7	
459	08 16 68	1558	30	6.7	0	6	44	2.6	
465	08 19 68	1508	50	6.3	0	10	194	2.2	
469	08 20 68	0815	188	6.6	0	8	38	2.6	
477	08 21 68	0840	10	0.0*	0*	0*	10	1.8	

TABLE NPG-4

THIS TABULATION IS THE RAW DATA FROM THE SURVEY  
CONCENTRATIONS ARE IN MILLIGRAMS PER LITER

STREAM ON CHRYSLER DRIVE									
ID	DATE	TIME	COD	PH	ALKAL	ACID	SS	OIL	
432	08 13 68	1140	700	7.3	0*	0	150	0.0*	
436	08 13 68	1602	39	7.0	0	0	26	13.4	
460	08 16 68	1530	3840	6.3	0	10	0*	686.0	

\*=NO ANALYSIS

CONTAINED A SIGNIFICANT PORTION OF FLOATING OIL

Drawing 1

Chrysler Corporation  
New Process Gear Division  
Syracuse, New York

Comparison of Influent Flow Meter Readings  
and  
Sanitary-Process Sewer Flows

